educational technology®

the magazine for managers of change in education

Volume 47, Number 6 November–December 2007

educational technology®

Volume XLVII
Number 6

November–December 2007

About This Issue

A special issue on opening educational resources; plus regular features

CONTENTS

Special Issue on Opening Educational Resources

Regular Features

books by popular writers about our networked age. When educational resources are opened into the Internet, they are affected by network laws that cause effects popularly described as the long tail, the wisdom of crowds, and peer production. OER becomes decentralized, tagged, aggregated, and miscellaneous. This language is the terminology of the future of learning. □

A comment on style. The backgrounds of our authors vary. Some are academics, others are administrators, and we are from several different countries. For this reason, in editing the articles for publication, we have retained the authors' styles, allowing some inconsistencies among the articles. American and British spellings have been retained.

Some words of appreciation. It has been an honor and privilege to edit this special issue of *Educational Technology*. My thanks to each of the authors for contributing. You are key leaders of OER, which is demonstrating an open way for knowledge and has importantly created a leading edge for education into the global learning commons. Thanks also to *Educational Technology* publisher Lawrence Lipsitz for his vision in suggesting this special issue in which to showcase OER and to light a path into the open place where 21st century education belongs.

Special Issue Suggestions?

This magazine's special issues, covering important areas in the field, are renowned for their thoroughness and overall excellence. More than one hundred special issues have been published since the 1960s, many of which have been instrumental in establishing whole new directions for work within educational technology and related domains. Your suggestions for future special issues are welcomed by the Editors.

How to Contact Us

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Towards a Global Learning Commons: ccLearn

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Though open educational resources (OER) promise to transform the conditions for teaching and learning worldwide, there are many barriers to the full realization of this vision. Among other things, much of what is currently considered "free and open" is legally, technically, and/or culturally incompatible. Herein, the authors give a brief history of open education, outline some key problems, and offer some possible solutions.

Introduction

Imagine that it is twenty years ago. A stranger asks to you prognosticate about the future. You are to postulate, he tells you, that there will be a worldwide computer network, open in design, that allows relatively cheap access to anyone. It will allow individuals and organizations to offer content to the world and edit it online, or to collaborate internationally in ways that formerly had been reserved for major publishing houses or giant multinationals. It takes a while, but eventually you grasp the idea. The stranger asks this question, "Given such technology, which development on this list will happen first?"

(1) A free worldwide online encyclopedia, constructed and edited in real time by volunteers, in multiple languages, offering a range of articles wider than any existing knowledge source, which allows anyone with a net connection to read, contribute, or edit.

Ahrash Bissell is the Executive Director of ccLearn. **James Boyle** is William Neal Reynolds Professor of Law at Duke Law School, a board member of Creative Commons, and the head of the ccLearn Steering Committee. The authors thank Marshall Smith, Cathy Casserly, Phoenix Wang, Hal Abelson, Mike Carroll, Laurie Racine, Jimmy Wales, Rich Baraniuk, Bobbi Kurshan, Lisa Petrides, Geoff Bowker, Eric Kansa, and many other participants in the OER community for their insights in discussion around these ideas, and note: They are not responsible for the arguments put forward here. Errors are ours. Direct correspondence to: ahrash@creativecommons.org .

Creative Commons Overview

Creative Commons is a non-profit organization committed to giving creators a variety of licensing tools that allow them to make their work available to the public on generous terms, while retaining copyright. The licenses are designed to be understood not merely by lawyers, but also by ordinary people and even by computers. The license terms are expressed in an easy-to-understand "commons deed" complete with icons, but also in "metadata" so that one can search not only for the content of the work, but also for its degree of legal openness. ("Show me calculus textbooks that are available for non-commercial use and modification.") Creative Commons (CC) licenses are used on Open Educational Resources such as MIT's OpenCourseWare, Connexions, Open Context, and many others. The advantage of the licenses is that they create a "commons" of material that can be used by anyone without permission or fee, and that they do so in a way that marks the content for computer searching. For Open Educational Resources, CC licenses that permit customization and adaptation of content are particularly important. CC licenses are international. They have been "translated" into the language and legal system of over 30 countries. For more details, go to: *www.creativecommons. org* .

(2) A type of computer program called free or open source software, constructed by a global army of programmers—some paid, some volunteer—all working outside of a single formal organizational structure. Each piece of coding becomes part of a software "commons" which anyone can add to, modify, or redistribute without permission or fee. This anarchic method of producing software would be strikingly successful, producing the dominant form of software on which the global computer network's servers actually run.

(3) A vast network of free and open educational resources, routinely used, contributed to and customized by teachers and students from kindergarten through graduate school to lifelong learners. Making lesson plans or curricular materials on this network would be as routine as saving it on one's computer. It would also be standard practice for teachers and learners to form and to customize their own courses of study, allowing them to annotate, comment upon, rank, and remix the material so as to suit it to their particular needs.

The question seems easy. Obviously, number three would be the first collaborative commons to develop. Who loves to share materials and tips more than teachers or students? Who has not developed a course or a lesson by customizing something from a colleague's files, or learned by pooling knowledge with one's fellow students? In which area—software, encyclopedias, or education—are the moral and practical impulses towards free access the strongest? Unlike the volunteer encyclopedist, the teacher has to do much of this work anyway. Why not share it? Unlike the world of programming, the "end user," or student, is routinely required to produce material in the form of assignments that could actually be added back into the network. The arguments are overwhelming: open learning will come first—open encyclopedias and open software later, if at all.

This prediction is logical, intuitive…and wrong. Wikipedia and open source software are established realities in our networked world. Open Educational Resources (OER) have made great strides over the last ten years, but they have not yet reached the prominence and sophistication described above. Why?

This article is an attempt to offer some partial answers to that question. It examines the reasons why open education is an exciting idea, describes some of its greatest successes to date, outlines the problems in creating a true global learning commons, and offers some possible solutions.

An OER Snapshot

MIT's pioneering OpenCourseWare (OCW) initiative, funded in part by the Hewlett Foundation, has made 1550 MIT courses available online for free.[1] Teachers and students get the course materials, the lecture notes, and—in some cases—videotapes of the actual lectures. MIT does not confer a degree on those who use the material, but it also does not hoard the knowledge and insights of its world-class teachers, instead opening their expertise to the world. And the world has responded. "Since September 2002, when the MIT OCW pilot phase opened to the public, MIT OCW materials have been translated into at least 10 languages, including Spanish, Portuguese, Chinese, Thai, French, German, Vietnamese, and Ukrainian." Some 100 courses have been translated into Spanish and over 130 into simplified Chinese. And all of this can be done without bureaucracy or lawyers because "[u]nder the MIT OCW Creative Commons license, users are allowed to translate MIT OCW materials into the language of their choice. Translations are acceptable use of MIT OCW materials provided they meet the three requirements of the MIT OCW Creative Commons license: that the user provide attribution of the materials they choose to adapt; that the use of the materials be a non-commercial activity; and that the user share the derivative work openly as MIT OCW is free and open, or 'share alike.'"[2]

[1] *http://ocw.mit.edu/OcwWeb/Global/AboutOCW/about-ocw.htm* .

[2] *http://ocw.mit.edu/OcwWeb/Global/AboutOCW/Translations.htm* .

But OpenCourseWare is only one out of hundreds of OER sources. Initiatives range from Open University's "Open Learn," Rice's Connexions, Curriki, and the OERCommons; collectively, these resources could be considered part of a burgeoning OER movement. Like Wikipedia and open-source software, the OER movement constitutes an attempt to transform the conditions of teaching and learning by demonstrating the power of resources that invite participation and that enable contributions to be combined, disassembled, and shared. These initiatives already range widely in both educational level and subject matter. Connexions' innovative learning tools allow users to rearrange the modules in a music theory course or one on Galileo's telescope. Curriki provides a gateway to a particularly strong collection of K–12 resources and curriculum tools. Open Learn makes Open University resources available for free to more than 500,000 people around the world. The list goes on and on.

Levels of Freedom

The push towards free educational resources is hardly a new one. From Franklin and the invention of the circulating library to the movements for universal literacy, there has been a common sense that as a social good, education is different. Some moral philosophers argue that the moral warrant for access to healthcare ought to be sickness rather than status or wealth. Not everyone would agree. Yet few would challenge the claim that societies are morally required to offer some level of education to their members, and that there are excellent practical and self-interested reasons to do so. In addition, much education now goes on outside of formal settings, and after the end of the formal educational process. The Internet offers the possibility of offering educational resources across huge distances at relatively low cost, and of offering learning tools that citizens can use at their own pace, to learn a new job-skill, or a new language, or to satisfy their curiosity. In many cases, the funders of these resources, whether states or private philanthropists such as the Hewlett Foundation, believe that it is unwise, impractical, and unjust to charge for access. Impractical, because knowledge goods are hard to price *before* you have acquired them and impossible thereafter. Unwise and unjust because the goal of global access to education is to diminish price barriers wherever possible. From this tenet comes the first and most obvious requirement of OER—access must be free.

Free access is commendable. Sadly, for some educational initiatives, freedom stops there. For example, MERLOT, which is otherwise an excellent educational repository, declares itself "free and open" but requires visitors and members of the public to get explicit permission prior to using materials on the site.[3] Excerpting, reproducing, making multiple copies for teaching, or printing portions in academic articles or books are all prohibited except insofar as they are allowed by the fair use provisions of the US Copyright Act. It goes without saying that reworking, adapting, translating, and republishing in compilations also require prior written permission. In repositories such as these, "openness" effectively means "you can read it on the Web for free." Adapting the terminology of free software licensing, we could think of the right to make non-commercial verbatim copies as the most basic freedom—freedom 0. Clearly some purportedly "free and open" educational sites have a more restricted vision. They see "openness" as simply the ability to read online without payment, a "freedom" granted to the readers of any public Website. Call this freedom level –1; the sub-basement below true Open Educational Resources.

Some form of access is clearly better than none, but to stop here is to ignore the most exciting features of OER. Truly open educational resources give the user the freedom not merely to read, but to redistribute and republish, and not merely to copy verbatim but to customize, combine, and modify. These are freedoms which traditional print learning materials made both physically and legally impossible. In short, OER allows us to do something with educational materials that we have never been able to do before so easily or on such a scale. A recent OECD report recognized that fact.

> The definition of OER currently most often used is "digitised materials offered freely and openly for educators, students and self-learners to use and reuse for teaching, learning and research". OER includes learning content, software tools to develop, use and distribute content, and implementation resources such as open licenses. This report suggests that "open educational resources" refers to accumulated digital assets that can be adjusted and which provide benefits without restricting the possibilities for others to enjoy them.[4]

If simple access—the ability to read, watch, or listen online—is Freedom Level –1, then the ability to copy and redistribute is Level 0. The freedom to modify, combine, and customize—in copyright terms, to make "derivative works"—is Freedom Level 1. The most expansive possible definitions of openness allow users to exercise these freedoms in both non-commercial and

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[3]MERLOT Intellectual Property Policy: *http://taste.merlot.org/intellectualpolicy.html* .

[4]*Giving Knowledge for Free: The Emergence of Open Educational Resources* (OECD) *www.sourceoecd.org/education/ 9789264031746* . Ironically the report itself bears the legend, "No reproduction, copy, transmission or translation of this publication may be made without written permission."

commercial contexts. It is worth noting that Wikipedia and open source software also give their users these freedoms. It is because "permission has been given in advance" for copying, modification, redistribution, and so on, that the "creative commons" in each area can actually function.

Problems and Solutions

Let us return to the question posed at the beginning of this essay. Despite the strides made in OER, it clearly does not possess the same level of visibility or ubiquity as Wikipedia or open source software. Why?

There are many reasons—and they differ at different levels of education. In K–12 education, technical unfamiliarity, sheer workload, and the demands of increasingly standardized curricula all combine to make it very hard for teachers to experiment with open educational tools. Students, too, have obstacles in their way. Even when teachers have the time, discretion, and facility to use online tools, there is a wariness about allowing students to participate actively rather than passively in the educational process. Much innovation is invisible. Legitimate privacy fears and copyright restrictions operate to keep most experimentation hidden behind the firewalls of an institutional BlackBoard or Moodle site—walled gardens rather than public parks.

In higher education the constraints of formal curricula or resources are fewer, but organizational caution, cultural barriers, and tenure standards that give little weight to pedagogical innovation all operate to limit participation in OER. More fundamentally, there is an "agency problem"; those who bear the cost of proprietary educational materials are generally not those who decide whether to develop or utilize free alternatives. For most teachers in the developed world (though not for their students or institutions) *all* teaching materials are effectively free of cost—though some are attracted by the possibility of customization that OER offers. Finally, there is the vital issue of quality. Producers of proprietary educational materials have a powerful incentive to produce popular and high-quality products, and to attract the attention of their audience with new features or online audio-visual materials. There can be comparable quality checks inside commons based movements—both open source software and Wikipedia rely on a variety of informal peer review techniques to police quality, while Web 2.0 tracking and tagging techniques allow the prospect of popularity-based mechanisms that imitate many of the beneficial features of markets, without demanding that the signals be in the form of price. But fully utilizing such techniques would require a transformation of the way that OER currently operates. We discuss some key goals of this transformation below.

No one initiative can remove all of these barriers to OER. Some barriers will only be overcome through generational change. The entry into the teaching profession of a generation of digital natives—used to using, remixing, and sharing digital content—will have impacts on education we have not yet begun to grasp. So long as this generation is *allowed* to experiment, they will. The same pressure will come from the student population. When those pressures meet standardized curricula and script-based, micro-managed teaching techniques, the results will be…interesting.

Other barriers will be overcome only by scale—as investments in OER finally reach a critical mass and start a self-sustaining reaction. This too happened with Wikipedia and open source software. Still others will require the creation of new initiatives and organizations that we can only dimly imagine now—trusted intermediaries that certify particular assemblages of OER as compliant with a state's formal curriculum, for example.

Acknowledging the range and variety of obstacles, we nevertheless want to suggest three goals that we believe are vital to the future of open educational resources. These goals alone will not guarantee success. Ignoring them, however, will all but guarantee failure.

Goals for a Global Educational Commons

From a technical point of view, the key aspect to openness—whether in content, standards, or software—is that it invites widespread cheap innovation and cooperation by strangers. No permission is required before I invent a word or a write a poem in English, use TCP/IP or HTML to produce a new service on the Web, or customize and remix a Connexions course on music theory. The language, protocols, and content are open, precisely so that innovation does not have to pass through some filter, make some payment, or receive some bureaucratic permission. To put it differently, there are more than six billion people in the world; it would be strange if at least one of them did not have a great idea about what to do with your content that you have never imagined.

The study of the history of technology, like that of pedagogical innovation, is a lesson in humility. Again and again we fail to predict both success and failure, imagine futures that fail to transpire, miss the key innovation while praising its doomed cousin. The OER movement too may disappoint but it has one key advantage; open resources are the path of humility. They are an invitation to experimentation and collaboration. The more open the resource, the less one is committed to a single pedagogical path or theory, the more one can profit from the insights of strangers, or collaborate with people one has never met. That is the true genius at the heart of commons-based movements such as Wikipedia and Open Source.

What would it take to realize that insight in the OER movement?

(1) Compatible and Interoperable Open Licensing Terms. Over the next ten years, millions of dollars, euros, yen, and yuan will be spent on supposedly open educational resources. If prior experience is anything to go by, however, many of these resources will only reach Freedom Level –1. The material will be there on the Web, but users will be forbidden to do the things that make OER truly interesting and transformative—reprinting, excerpting, customizing, and so on. Worse still, the material will be incompatible with the other theoretically open educational resources. For example, a site on geology and volcanic eruptions would have vital material that a different site on the history of ancient Crete could use to advantage. Sites created in the public interest by taxpayer or philanthropic payment may—as a practical matter—be utterly incapable of working together either because their licensing terms explicitly forbid, because "license proliferation" has spawned a host of incompatible licenses, or simply because the site leaves ambiguous what may be done with the material. This would be a disaster, a tragic waste of scarce educational resources. Thus, the first goal is that OER sites must actually be open, and that the freedoms given to the site's users be clear, comprehensible, and compatible. Where possible, we would recommend the Creative Commons Attribution, or Attribution, Share-alike licenses, which give both Level 0 and Level 1 freedom. If more restrictive licensing—such as the Non-Commercial license—is truly necessary, it should be clearly identified and marked as such. In addition, licenses should not simply be clear to people, they should be clear to search engines, so that I can specify the terms of licensing as part of my search, or automate the process of retrieval. Creative Commons licenses already allow this—by specifying the licensing restrictions on the content in metadata that are picked up by search engines such as Google and Yahoo.

(2) Compatible Technical Standards. One of the biggest obstacles to technical innovation is the failure to settle on interoperable standards. Whether it is incompatible gauges on railway tracks or competing DVD formats, lack of standardization is an enormous impediment to innovation, particularly where one needs to combine and remix. Imagine that you develop a process that can mine video material on OER sites, transcribe a rough version of the dialogue, and add "tags" to the site that allow individuals to search within videos to pinpoint a particular discussion of programming in Java or moral relativism. If we follow goal (1), you will have been granted the legal freedom to engage in this enormously useful activity; permission will have been granted in advance. But what about the *technical* freedom? Incompatible video formats, varying encryption protocols, or streaming technologies that are applied by default even to open content—these could cripple the very types of experimentation we are trying to encourage.

(3) A Cultural Shift: From "My Site" to "Our Commons." At the moment the OER movement is taking its first steps beyond a culture focused around "my site" towards a culture that is focused around "our commons." Most people who create OER sites have a sense of who they expect their users to be and what needs those users have. This is all to the good, if it is not to the exclusion of those users whose needs—or innovations—we have totally failed to imagine. To quote Michael Carroll, if the future of learning is interdisciplinary, it is axiomatic that all of our content is a marginal case for someone else's discipline. The evolutionary biologist studying lizard speciation in the Galapagos has a very different set of needs in querying an open site on the geology of the islands than the geologists the creators of the site imagined. Yet his need—and the benefits of cross-fertilization—are no less real. They require not just legal or technical openness but a cultural change in orientation. To paraphrase John Seely Brown and Dan Atkins, we need to shift perspectives from "this courseware is mine" to "this courseware is for (open) mining."[5]

The goals we describe here are not sufficient conditions for the success of the open educational resource movement. That movement also needs to be brought to the public eye. It needs competitions to feature content, rigorous measures of impact and success, and serious engagement with the bureaucracies at every level of education. We need to apply to OER the same ingenuity in social ranking and tagging tools that we apply to selling books, or letting teenagers flirt with each other on MySpace. Still, we believe that these goals are necessary conditions to success—and that they are independently defensible if we wish to get the most out of our social investment in access to education online.

Our organization, ccLearn, is working with the OER community to discuss the standards and best practices that are necessary if the movement is to survive and flourish. We invite you to work with us. At the very least, we should make sure that millions of dollars poured into open educational resources does not result in scattered islands of incompatible and mutually incomprehensible content. A pedagogical Tower of Babel would be a tragically wasted opportunity, even if the sign on the door claimed it was open to all. □

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[5] *A Review of the Open Educational Resources (OER) Movement: Achievements, Challenges, and New Opportunities.* Dan Atkins, John Seely Brown, Allen Hammond, 2007, The William and Flora Hewlett Foundation, page 10; *http://www.hewlett.org/Programs/Education/OER/OpenContent/Hewlett+OER+Report.htm* .